

ABSTRACT

With a simple circuit configuration which does not conduct high frequency signal processing, a quantum computing device, a quantum bit readout processing unit of the quantum computing device, and a quantum bit readout processing method are provided. By controlling a quantum bit structure, which is formed with a counter electrode coupling with a quantum box electrode through a first tunnel barrier, with a gate voltage, a Cooper-pair extracted from the quantum box electrode after computation is accumulated in a trap electrode coupling with the quantum bit structure by sandwiching a second tunnel barrier. By coupling the trap electrode and an island electrode of a readout single electron transistor through a static capacitance, a change of electric charge in the trap electrode is read out as a direct current value of the single electron transistor.